

HELIUM-NEON LASER LIGHT SOURCE GENERATING TWO
HARMONICALLY RELATED, SINGLE-FREQUENCY WAVELENGTHS FOR
USE IN DISPLACEMENT AND DISPERSION MEASURING INTERFEROMETRY

Abstract of the Invention

The invention features a displacement and dispersion measuring interferometry system having a Helium-Neon laser light source. The light source can be a Helium-Neon laser that includes an intracavity doubling crystal and an intracavity etalon to generate two harmonically related, single-frequency wavelengths at sufficient powers for interferometric dispersion measurements. Alternatively, the light source can be a single-mode Helium-Neon laser that directs a single-frequency input beam into a resonant external cavity enclosing a doubling crystal to generate two harmonically related, single-frequency wavelengths at sufficient powers for interferometric dispersion measurements. In addition to dispersion measurements, the inherent wavelength stability of the Helium-Neon source permits high-accuracy displacement measurements. Thus, the Helium-Neon laser light source is sufficient for the interferometry system to simultaneously measure displacement and dispersion, and correct the displacement measurement for air-turbulence using the dispersion measurement.